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Vigilance, Precaution and Routine Behavior – The Socio-cultural Impact

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14. ABSTRACT Human brains comprise threat-detection systems dedicated to: i) identifying particular cues of potential danger; ii) activate appropriate precautions; and iii) after precautions are taken, providing people with a sense of safety. Accordingly, threat generates profound changes in behavior via its controlling mechanisms. Individuals (humans or animals) may respond to overt life-threat by freezing or fleeing, whereas populations may include a socio-cultural component in threat response. The research completed under this grant had three objectives: <ol style="list-style-type: none"> 1. To uncover the structure of the spontaneous, commanded, and abnormal task performance and to assess the functionality and non-functionality in each mode of performance. 2. To compare routines, rituals and commanded performance of US citizens with that of South-African, Israeli, and Irish individuals. 3. To evaluate the impact of threat on individuals and groups with different social background. Research results are reported in five peer-reviewed journals. Findings are summarized and references included.						
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Submitted by: **David Eilam, Ph.D.**Table of contents

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1. *To uncover the structure of the spontaneous, commanded, and abnormal task performance and to assess the functionality and non-functionality in each mode of performance.*
2. *To compare routines, rituals and commanded performance of US citizens with that of South-African, Israeli, and Irish individuals.*
3. *To evaluate the impact of threat on individuals and groups with different social background.*

B. Publications resulting from the grant (items 1-5 are attached)

List of attachments

1. Zor, R., Keren, H., Hermesh, H., Szechtman, H., Mort, J. and Eilam, D. 2009.
2. Keren, H., Boyer, P., Mort, J. and Eilam, D. 2010.
3. Izhar, R., and Eilam, D. 2010.
4. Eilam, D., Izhar, R., and Mort, J. 2011.
5. Zor, R., Fineberg, N., Eilam, D. and Hermesh, H. in press.

A. Summary of the results and achievements

Three objectives were outlined in the application for the above grant. These objectives, along with the achievements or progress for each of them, are detailed below (numerals refer to the publications emanating from the grant, as listed in section B).

1. *To uncover the structure of the spontaneous, commanded, and abnormal task performance and to assess the functionality and non-functionality in each mode of performance.*

A paper with these results was already published [1]. We found that daily motor routines comprise idiosyncratic non-functional acts, and that the way to bypass these unnecessary acts is not via practicing the routine, but via repeated commanded performance. We followed this conclusion with another study [6] in which we compared normal daily routines, normal rituals and pathologic rituals. For the first time we managed to demonstrate what the difference between these repetitive behaviors that comprise a large part of our behavioral repertoire. These differences are summarized in Table 1. We expect that this research will be submitted for publications within the next 3 months.

Table 1

	Pathologic Rituals	Normal Rituals	Normal Routines
Rate of repetitions	High	High	Low
Idiosyncratic acts	Numerous	Few	Many
Idiosyncratic acts	Vary among actors; relatively the same within actor's repetition	Vary among actors; relatively the same within actor's repetition	Vary among <u>and</u> within actors
Idiosyncratic acts	30-50% of them occur after the "functional end" of the task	All of them occur before the functional end, with aggregation at the start of the sequence	Scattered throughout the task

2. *To compare routines, rituals and commanded performance of US citizens with that of South-African, Israeli, and Irish individuals.*

Data acquisition and analysis for this item had been completed. The novel methodology of video telemetry was first used and published in the framework of studying pathologic rituals [2,3]. The present study on cross-cultural differences and similarities will be published before the end of this year [7]. As hypothesized, we found that routines in the various countries comprise the same functional acts, but differ in the idiosyncratic non-functional acts. The hypothesized higher rate of idiosyncratic acts where precaution was higher was found to be marginal.

3. To evaluate the impact of threat on individuals and groups with different social background.

A major breakthrough was achieved in this item. We developed an animal model to study what people in a group act differently than they would have acted individually under otherwise identical circumstances ('Herd behavior') [4,5]. Indeed, our misunderstanding of crowd behavior is reflected in the unpredicted recent uprising in Egypt, where it is unknown whether these were merely people with the same ideas converging to act together, or whether they were, at least partially, led by certain organizations. While the current tools scrutinize such events merely *a-posteriori*, our model is not confined in terms of manipulating the groups and the testing conditions, and even enables to invasively search for the biobehavioral systems that control group-effects. After providing a review on the background for this study [4], and setting the model. We now wish to embark into another study of modeling the impact of specific individuals on the behavior of the entire group (an application that was submitted to AFOSR).

B. Publications resulting from the grant (items 1-5 are attached)

1. Keren, H., Boyer, P., **Mort, J.** and **Eilam, D.** Pragmatic and idiosyncratic acts in human everyday routines: The counterpart of compulsive rituals. *Behavioural Brain Research*, 212 (2010): 90-95.
2. Zor, R., Keren, H., Hermesh, H., Szechtman, H., **Mort, J.** and **Eilam, D.** Obsessive-Compulsive Disorder (OCD): A disorder of pessimal (non-functional) motor behavior. *Acta Psychiatrica Scandinavica*. 180 (2009): 288-298.
3. Zor, R., Fineberg, N., **Eilam, D.** and Hermesh, H. Video telemetry and behavioural analysis discriminates between compulsive cleaning and compulsive checking in obsessive-compulsive disorder. *European Neuropsychopharmacology*, in press.
4. **Eilam, D.**, Izhar, R., and **Mort, J.** Threat detection: Behavioral consequences in animals and humans. *Neuroscience and Biobehavioral Reviews*; 35 (2011): 999-1006.
5. Izhar, R., and **Eilam, D.** Together they stand: A life-threatening event reduces individual behavioral variability in groups of voles. *Behavioural Brain Research*, 208 (2010): 282-285.
6. Keren, H., Boyer, P., **Mort, J.** and **Eilam, D.** The spatio-temporal structure of normal motor routines substantially differs from , rituals in normal and in pathologic behavior. *In preparation*.
7. Keren, H., **Mort, J.** and **Eilam, D.** Between-country difference in daily motor behavior: the socio-cultural impact. *In preparation*.